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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/939,327	08/24/2001	Mingqi Zhao		3869

7590 04/14/2004  
Ms. Virginia Griffith  
1288 Pear Avenue  
Mountain View, CA 94043

EXAMINER

DIAMOND, ALAN D

ART UNIT PAPER NUMBER

1753

DATE MAILED: 04/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/939,327

Applicant(s)

ZHAO ET AL.

Examiner

Alan Diamond

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 October 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-45 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 9.10.11.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Drawings***

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "204" has been used to designate both a conductive fluid and a microchannel. See page 14, line 8, and page 17, line 12, of the instant specification. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: reference sign 466 in paragraph 0096. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: reference sign 511 in Figure 5, reference signs 480 and 482 in Figure 6D, reference signs 604 and 608 in Figure 8, reference signs 100 and 101 in Figure 9, reference signs 800 and 820 in Figure 18, and reference sign 880 in Figure 22A. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

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4. The drawings are objected to because Figure 12A is not discussed in the Detailed Description section of the specification. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 18, 21, 22, and 26-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

At line 1 in each of claims 18 and 21, the term "said ink" should be changed to "said ink pattern" since it is the ink pattern that will have a width and thickness.

In claim 22, at line 2, the term "comprising" should be changed to "consisting of" so as to use proper Markush language.

In claim 26, at line 6, the term "reduces" is indefinite because it is subjective. It is not clear exactly with respect to what the bubble formation is reduced. The same applies to dependent claims 27-30.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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8. Claims 1-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bentsen et al, U.S. Patent 6,375,871.

Bentsen et al teaches a microfluidic device having a cover (70), a substrate (68), a fluid reservoir (74), a microchannel (38), and a conductive circuit trace (78) on the cover (70) so that when a material is present in the reservoir, the conductive circuit trace (78) makes electrical contact with the material in the channel and reservoir (see Figures 9a and 9b; and col. 10, line 47 through col. 11, line 9). Said trace can be made from conductive silver-filled inks (see the paragraph bridging cols. 10 and 11). It is the Examiner's position that bubble formation will inherently be reduced and heating of said material will occur with Bentsen et al's device having silver-filled ink trace. The device can be used for analyzing or otherwise manipulating biological fluid samples (see col. 1, lines 10-16). Bentsen et al teaches the limitations of the instant claims other than the difference which is discussed below.

Bentsen et al does not provide a specific example of its microfluidic device wherein said conductive silver-filled ink is used as the trace. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have prepared Bentsen et al's microfluidic device wherein said conductive silver-filled ink is used as the trace because such a device is clearly within the scope of Bentsen et al's disclosure.

9. Claims 1-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bjornson et al, U.S. Patent 6,103,199.

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Bjornson et al teaches the claimed microfluidic device wherein the electrodes can be made from, for example, conductive ink (see Figures 1-12; col. 1, lines 6-10; col. 7, line 14 through col. 8, line 40; and col. 23, lines 30-59). It is the Examiner's position that bubble formation will inherently be reduced and heating of the material processed in the device will occur by Bjornson et al's device having conductive ink electrode. Bjornson et al teaches the limitations of the instant claims other than the difference which is discussed below.

Bjornson et al does not provide a specific of its microfluidic device wherein said conductive ink is used as the electrode. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have prepared Bjornson et al's microfluidic device wherein said conductive ink is used as the electrode because such a device is clearly within the scope of Bjornson et al's disclosure.

10. Claims 1-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hu et al, U.S. Patent 6,623,860. The instant claims are not fully supported by provisional application 60/233,838, and thus, have a filing date of August 24, 2001. The material in Hu et al referred to below is fully supported by provisional application 60/239,305 and thus, has a filing date of October 10, 2000.

Hu et al teaches the claimed microfluidic device wherein the electrodes can be made from, for example, conductive ink (see Figures 1A-1C; col. 1, lines 16-27; col. 8, lines 51-63; and col. 12, line 38-col. 13, line 12). It is the Examiner's position that bubble formation will inherently be reduced and heating of the material processed in the

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device will occur by Hu et al's device having conductive ink electrode. Hu et al teaches the limitations of the instant claims other than the difference which is discussed below.

Hu et al does not provide a specific of its microfluidic device wherein said conductive ink is used as the electrode. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have prepared Hu et al's microfluidic device wherein said conductive ink is used as the electrode because such a device is clearly within the scope of Hu et al's disclosure.

11. If a copy of a provisional application listed on the bottom portion of the accompanying Notice of References Cited (PTO-892) form is not included with this Office action and the PTO-892 has been annotated to indicate that the copy was not readily available, it is because the copy could not be readily obtained when the Office action was mailed. Should applicant desire a copy of such a provisional application, applicant should promptly request the copy from the Office of Public Records (OPR) in accordance with 37 CFR 1.14(a)(1)(iv), paying the required fee under 37 CFR 1.19(b)(1). If a copy is ordered from OPR, the shortened statutory period for reply to this Office action will not be reset under MPEP § 710.06 unless applicant can demonstrate a substantial delay by the Office in fulfilling the order for the copy of the provisional application. Where the applicant has been notified on the PTO-892 that a copy of the provisional application is not readily available, the provision of MPEP § 707.05(a) that a copy of the cited reference will be automatically furnished without charge does not apply.

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12. Claims 1-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bjornson et al, U.S. Patent 6,284,113.

Bjornson et al teaches the claimed microfluidic device wherein the electrodes can be made from, for example, conductive ink (see Figures 1-3, 16, and 17; col. 1, lines 10-18; col. 11, lines 26-52; col. 15, line 14 through col. 16, line 11; and col. 23, lines 42-65). It is the Examiner's position that bubble formation will inherently be reduced and heating of the material processed in the device will occur by Bjornson et al's device having conductive ink electrode. Bjornson et al teaches the limitations of the instant claims other than the difference which is discussed below.

Bjornson et al does not provide a specific of its microfluidic device wherein said conductive ink is used as the electrode. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have prepared Bjornson et al's microfluidic device wherein said conductive ink is used as the electrode because such a device is clearly within the scope of Bjornson et al's disclosure.

13. Claims 1-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bjornson et al, U.S. Patent Application Publication 2002/0092767. The instant claims are not fully supported by provisional application 60/233,838, and thus, have a filing date of August 24, 2001. Bjornson et al has a continuity date at least back to April 25, 2000.

Bjornson et al teaches the claimed microfluidic device wherein the electrodes can be made from, for example, conductive ink (see Figures 1-9; and paragraphs 0009, 0035, and 0057). It is the Examiner's position that bubble formation will inherently be



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reduced and heating of the material processed in the device will occur by Bjornson et al's device having conductive ink electrode. Bjornson et al teaches the limitations of the instant claims other than the difference which is discussed below.

Bjornson et al does not provide a specific of its microfluidic device wherein said conductive ink is used as the electrode. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have prepared Bjornson et al's microfluidic device wherein said conductive ink is used as the electrode because such a device is clearly within the scope of Bjornson et al's disclosure.

### ***Conclusion***

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent Application Publications 2002/0122747 and 2004/0018297 are hereby made of record.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan Diamond whose telephone number is 571-272-1338. The examiner can normally be reached on Monday through Friday, 5:30 a.m. to 2:00 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

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Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Alan Diamond  
Primary Examiner  
Art Unit 1753

Alan Diamond  
April 1, 2004

A handwritten signature in cursive script, appearing to read "Alan Diamond", written in black ink.